Abstract Submitted
for the DAMOP20 Meeting of
The American Physical Society

High-precision ultracold-molecule spectroscopy for metrology and new physics EMILY TIBERI, HENDRIK BEKKER, KON H LEUNG, CHIH-HSI LEE, Columbia University, IWONA MAJEWSKA, ROBERT MOSZYNSKI, University of Warsaw, TANYA ZELEVINSKY, Columbia University — Ultracold molecules offer a rich platform for precision measurements of fundamental interactions, metrology, and quantum chemistry. We employ an optical lattice to trap ultracold $^{88}Sr_2$ molecules with the goal of probing fundamental molecular structure and studying new, beyond-the-Standard-Model physics, including enhanced constraints on nanometer-scale gravity. Improvements to *ab-initio* theory models are crucial in order to select optimal clock states and to develop predictive models to guide the experiment. In the most recent experimental work, we measured the binding energies and transition strengths for both deeply and weakly bound vibrational levels in the ground and first excited states via light shifts and Autler-Townes spectroscopy. These measurements inform theory and improve our current predictive models and understanding of the underlying molecular structure, enabling us to design a molecular clock with longer quantum-state coherence.

Emily Tiberi
Columbia University

Date submitted: 31 Jan 2020 Electronic form version 1.4